# RESCUE OF EMPLOYEE FROM LIVE WIRE ON GROUND

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## 1. GENERAL

**1.01** This section describes methods to estimate the voltage of a power wire that is in contact with an employee at the ground level and a course of action to follow in rescuing the employee.

**1.02** In some cases, the victim of an electric shock may remain in contact with the energized voltage source because of not being able to release a live conductor or due to an unconscious state. It should be assumed that a wire in contact with an employee is energized unless it is evident that the energized voltage source has been broken. The rescuer shall take all of the precautions as specified in these instructions to prevent another injury due to electric shock.

**1.03** In all cases where an employee has suffered a severe electric shock, another employee or nonemployee, when available, should be directed to call the appropriate emergency unit (rescue squad, fire department, police, etc). The person placing the call should be instructed to dial the 911 emergency number (if in use) or 0 for emergency assistance. The specific location of where the emergency assistance is required should be clearly identified. However, rescue efforts shall proceed and appropriate first aid techniques applied until assistance arrives. If the victim is conscious and can be moved safely, after receiving first aid, the employee should be taken to a physician as soon as possible. Always identify the hazard to proper authority before leaving the sight.

**1.04** In administering first aid and transporting the victim, follow the recommendations covered in the American Red Cross First Aid Text Book as taught in the Bell System first aid and personal safety course.

**1.05** In all electric shock cases, notify the power company involved as soon as practical.

**1.06** This section and the American Red Cross First Aid Text Book should be reviewed at intervals, so that if an employee is in contact with a live wire, a rescue will be handled effectively. It is essential that each employee be prepared to cope with emergency situations and be able to provide lifesaving aid to any victim involved. The difference between life and death, in many cases, depends upon the knowledge, skill, and judgment exercised by the rescuer.

## 2. PLANNING THE RESCUE

**2.01** The employee who first observes that a fellow worker has contacted a live wire, if others are present, shall immediately call out clearly and distinctly the location of the victim. The crew, under the direction of one of their members as the leader, shall start at once with the rescue operations outlined in the following paragraphs.

**2.02** Before starting the rescue, plan quickly but carefully how the operation can best be

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carried out. The most important details to be considered include:

(a) Position of the injured employee with respect to the power conductor. If there is doubt as to whether or not the power contact is clear from the victim, assume that the employee is still in contact with the voltage source.

(b) Availability of dry rescue materials, such as a rope, rubber gloves, insulating blanket, tree pruner, board, "B" clearance rule, etc.

(c) Determine the approximate voltage if the victim is still in contact with a voltage source (see paragraph 3.07).

(d) Employees should make it a point to become familiar with the types of power supply systems in the locality where they work, so they may be able to accurately estimate the voltage of power circuits.

(e) The rescuer, in attempting to break a power contact, should be ever mindful of the possibility of becoming a part of the power circuit to ground. Whenever possible, the rescuer should stand on an insulating blanket, dry boards, or other dry insulating material to provide added protection. Only tools and materials that are nonconductive and free from moisture are to be used.

(f) Bystanders should be instructed to stay clear of the downed power wire. A responsible person should be assigned to keep others away from the live wire.

## 3. POWER SUPPLY VOLTAGES

**3.01** The possibility of contact with a foreign potential is greatly reduced if clearance and separation requirements are followed on joint construction as described in Section 620-215-012.

**3.02** Those cases where the proper separation is not or cannot be obtained should be referred to the Plant Engineer for prompt attention.

**3.03** Insulating gloves are designed to protect a workman against possible exposure to voltages that could be encountered in certain work operations.

In joint construction, any one of the following supply voltages could be encountered:

- Secondary distribution—600 volts or less,
- Primary distribution—2200 to 34,500 volts or,
- Subtransmission—26,400 to 69,000 volts.

In most instances, power company facilities on joint use poles have supply voltages lower than 10,000 volts to ground—the maximum limitation of our insulating gloves. These supply voltages quoted, reflect phase-to-phase voltage. The voltage from one wire to ground is approximately 58 percent of the phase-to-phase voltage (except in the case of a grounded delta circuit where it is 100 percent). Therefore, the voltage to ground on a 26,400 volt line would be approximately 15,240 volts—higher than the limits of the insulating gloves.

Therefore, it is imperative that employees be able to identify voltages and take additional precautions when exposed to voltage above 10,000 volts to ground.

**3.04** Power conductors immediately above telephone facilities, if attached to spool type insulators on a crossarm, can safely be assumed to be secondary with voltages less than 600 volts.

**3.05** It is quite common also to have a primary distribution supply, above the secondary distribution with a voltage range of 2200 to 34,500 volts.

**3.06** A rescuer could safely clear a live wire from a victim by handling a conductor if the voltage to ground is 10,000 volts or less while wearing insulating gloves. However, additional protection is provided the rescuer by using a dry handline, board, pruning sticks, "B" clearance rule, etc, in addition to the insulating gloves.

**3.07** A rescuer can estimate the voltage of the live wire by observing the size and type of insulator, voltage markings on a transformer, position of supply conductors on a pole, etc (see Fig. 1, 2, and 3).

**3.08** Employees should make it a point to acquaint themselves with the power company facilities

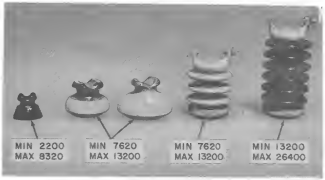


**Fig. 1—Examples of Voltage Range or Power Company Insulators**

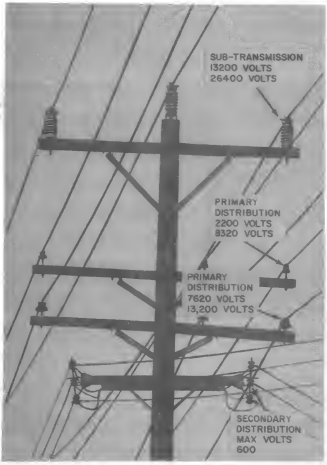


**Fig. 2—Examples of Electrical Power Supply Voltages**

**Fig. 3—Typical Transformer With Primary Marking of Supply Voltage**

in locations where they work so they may be able to accurately estimate the supply voltage.

## 4. FREEING EMPLOYEE FROM A LIVE WIRE OF LESS THAN 10,000 VOLTS TO GROUND

**4.01** A rescuer going to the aid of an employee in contact with a live wire, should use insulating gloves in removing the power contact. If insulating gloves are not available, a dry rope, dry board, dry tree pruner, nonmetal dry ladder, "B" clearance rule, etc, could be used to break the contact. The rescuer must remain calm, think clearly, and avoid impulsive and unsafe operations. Keep in mind that wet or damp articles are not safe insulators and could transmit a severe shock when in contact with a live wire.

**4.02** When handling wires (with insulating gloves) that may be "hot," use only one hand if practical, and keep the other hand behind you and other body parts clear of wires, down guy, pole, pedestal, or any grounded structure.

**4.03** In the majority of cases it should be possible to clear the contact without handling a supply conductor. A dry handline looped around the conductor will allow the rescuer to clear the contact. A " B" clearance rule or dry board or dry wooden tool such as pruning sticks, pike pole, etc, could be used to push the wire away from the victim. Do not use green or damp wood in moving a live wire and position yourself so as to avoid becoming a part of the power circuit.

**4.04** If it is necessary to cut energized telephone wires, insulating gloves must be worn. A tree pruner with a dry pull rope may be used to cut the wires.

**4.05** Under extreme conditions, power company circuits with voltages under 10,000 volts to ground may be cut provided that rubber gloves are worn while the wire is being cut. Strict attention must be given to determine where the cut wires will fall.

## 5. FREEING EMPLOYEE FROM A LIVE WIRE OF MORE THAN 10,000 VOLTS TO GROUND

***Warning: Do not attempt to cut a circuit where the voltage exceeds 10,000 volts to ground.***

**5.01** Since voltages over 10,000 volts to ground may exceed the safe limits of the insulating gloves, extreme caution must be exercised to free the victim from a live wire. With the use of additional dry insulating material, a rescuer could safely remove a power contact. However, under no circumstances should the rescuer attempt to break the power contact by wearing only the insulating gloves.

**5.02** Dry insulating materials, such as pruning sticks, pike pole, rope, insulating blanket, etc, when used together with insulating gloves will provide the rescuer the added insulation to release a power contact safely.

**5.03** The rescuer, wearing insulating gloves and standing on an insulating blanket or other dry insulated material, can use a dry rope, nonmetal ladder, or tree pruner to break the power contact at the gound level. A "B" clearance rule is sufficient for any voltage likely to be encountered.

***Warning: A rescuer must not come in contact with a down guy, pole, pedestal, or any other object while attempting to break the power contact.***

Keep in mind that wet or damp articles are not safe insulators and could transmit a severe shock when in contact with a live wire.

*Note:* This method should not be used under damp or wet weather conditions or if the rescuer is not sure that the device used to break the power contact is free from moisture.

**5.04** A majority of energized wire contacts can be removed safely without endangering the rescuer. However, in those instances where it would be hazardous for the rescuer to try to break the contact, the power company should be requested to break a contact or open the circuit before proceeding with the rescue.

**5.05** ***Remember***—under no circumstance should the rescuer attempt to break the power contact by wearing only insulating gloves—additional dry insulating materials must always be used.